

# Draft Genome Sequences of *Devosia* sp. Strain 17-2-E-8 and *Devosia riboflavina* Strain IFO13584

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**Here we report the draft genome of *Devosia* sp. strain 17-2-E-8, isolated from Ontario agricultural soil (Canada) with promising deoxynivalenol biotransformation capabilities. In addition, we report the draft genome of *Devosia riboflavina* strain IFO13584, used as a control strain in our studies aimed at highlighting unique gene clusters involved in deoxynivalenol epimerization.**

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*Devosia* as a genus has recently gained attention for the ability of many reported species to survive harsh environmental conditions, including hexachlorocyclohexane dump sites, diesel-contaminated soils, beach and deep-sea surface sediments, and alpine glacier cryoconite (1–12). Furthermore, a number of *Devosia* isolates have shown promising biotransformation capabilities that could lead to their utilization in agricultural and industrial applications as detoxifying agents (4, 13–16). Our laboratory recently reported the isolation of a new *Devosia* species, *Devosia* sp. strain 17-2-E-8 (IDAC 040408-1 = ATCC PTA-121309) with a proposed designation of *Devosia epimeris*, which is capable of aerobically biotransforming deoxynivalenol (DON), a mycotoxin produced by various *Fusarium* species (15, 16). In our efforts to decipher the metabolic pathways responsible for this transformation, we report the *de novo* genome assemblies of two *Devosia* isolates: *Devosia* sp. strain 17-2-E-8 and *D. riboflavina* strain IFO13584 (ATCC 9526). *D. riboflavina* IFO13584 served as a control strain in these studies to highlight unique gene clusters in *Devosia* sp. 17-2-E-8 possibly involved in DON epimerization.

Genomic DNA from both isolates was purified using the Pure-gene Yeast/Bact. kit (Qiagen, Toronto, Canada) after 7 days of growth in LB broth and subjected to whole-genome sequencing using the MiSeq sequencer (Illumina, San Diego). Following fragmentation, end-repair, and sample indexing, a total of 17,343,120 and 15,745,680 of 300-bp paired-end reads were produced, resulting in 1,100× and 882× coverage for the *Devosia* sp. 17-2-E-8 and *D. riboflavina* IFO13584 genomes, respectively.

The FASTQC algorithm (17) was used to check the initial quality of our sequence reads. After removal of overrepresented sequences and quality trimming of the reads, *de novo* genome assemblies were generated using the CLC Genomics Workbench version 6.0.1 package. This resulted in a 4.7-Mb genome consisting of 125 contigs for *Devosia* sp. 17-2-E-8 and a 5.3-Mb genome consisting of 113 contigs for *D. riboflavina* IFO13584. Automated genome annotation was performed using both the RAST server (18) and the NCBI Prokaryotic Genome Annotation Pipeline (PGAP), which predicted 3,943 and 4,273 coding DNA sequences

for *Devosia* sp. 17-2-E-8 and *D. riboflavina* IFO13584, respectively. An in-depth comparative genomic analysis of our data will be included in a future publication.

**Nucleotide sequence accession numbers.** Both whole-genome shotgun assemblies of *Devosia* sp. 17-2-E-8 and *D. riboflavina* IFO13584 were deposited at DDBJ/EMBL/GenBank under the accession numbers JQGB00000000 and JQGC00000000, respectively.

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## REFERENCES

- Dadhwal M, Singh A, Prakash O, Gupta SK, Kumari K, Sharma P, Jit S, Verma M, Holliger C, Lal R. 2009. Proposal of biostimulation for hexachlorocyclohexane (HCH)-decontamination and characterization of culturable bacterial community from high-dose point HCH-contaminated soils. *J. Appl. Microbiol.* 106:381–392. <http://dx.doi.org/10.1111/j.1365-2672.2008.03982.x>.
- Dua A, Malhotra J, Saxena A, Khan F, Lal R. 2013. *Devosia lucknowensis* sp. nov., a bacterium isolated from hexachlorocyclohexane (HCH) contaminated pond soil. *J. Microbiol.* 51:689–694. <http://dx.doi.org/10.1007/s12275-013-2705-9>.
- Galatis H, Martin K, Kämpfer P, Glaeser SP. 2013. *Devosia epidermidihirudinis* sp. nov. isolated from the surface of a medical leech. *Antonie Van Leeuwenhoek* 103:1165–1171. <http://dx.doi.org/10.1007/s10482-013-9895-3>.
- Kizaki N, Yasohara Y, Nagashima N, Hasegawa J. 2008. Characterization of novel alcohol dehydrogenase of *Devosia riboflavina* involved in stereoselective reduction of 3-pyrrolidinone derivatives. *J. Mol. Cat. B Enzymatic* 51:73–80. <http://dx.doi.org/10.1016/j.molcatb.2007.10.017>.
- Kumar M, Verma M, Lal R. 2008. *Devosia chinhatensis* sp. nov., isolated from a hexachlorocyclohexane (HCH) dump site in India. *Int. J. Syst. Evol. Microbiol.* 58:861–865. <http://dx.doi.org/10.1099/ijs.0.65574-0>.
- Lee SD. 2007. *Devosia subaequoris* sp. nov., isolated from beach sediment. *Int. J. Syst. Evol. Microbiol.* 57:2212–2215. <http://dx.doi.org/10.1099/ijs.0.65185-0>.
- Li L, Zhao C, Liu Q, Zhang Y. 2013. Isolation and genetic identification of dibenzothiophene degrading bacteria from contaminated soil. *Adv.*

- Mat. Res. 610–613:292–295. <http://dx.doi.org/10.4028/www.scientific.net/AMR.610-613.292>.
8. Rivas R, Willems A, Subba-Rao NS, Mateos PF, Dazzo FB, Kroppenstedt RM, Martínez-Molina E, Gillis M, Velázquez E. 2003. Description of *Devosia neptuniae* sp. nov. that nodulates and fixes nitrogen in symbiosis with *Neptunia natans*, an aquatic legume from India. Syst. Appl. Microbiol. 26:47–53. <http://dx.doi.org/10.1078/072320203322337308>.
  9. Romanenko LA, Tanaka N, Svetashev VI. 2013. *Devosia submarina* sp. nov., isolated from deep-sea surface sediments. Int. J. Syst. Evol. Microbiol. 63:3079–3085. <http://dx.doi.org/10.1099/ijs.0.046607-0>.
  10. Ryu SH, Chung BS, Le NT, Jang HH, Yun PY, Park W, Jeon CO. 2008. *Devosia geojensis* sp. nov., isolated from diesel-contaminated soil in Korea. Int. J. Syst. Evol. Microbiol. 58:633–636. <http://dx.doi.org/10.1099/ijs.0.65481-0>.
  11. Verma M, Kumar M, Dadhwal M, Kaur J, Lal R. 2009. *Devosia albogilva* sp. nov. and *Devosia crocina* sp. nov., isolated from a hexachlorocyclohexane dump site. Int. J. Syst. Evol. Microbiol. 59:795–799. <http://dx.doi.org/10.1099/ijs.0.005447-0>.
  12. Zhang DC, Redzic M, Liu HC, Zhou YG, Schinner F, Margesin R. 2012. *Devosia psychrophila* sp. nov. and *Devosia glacialis* sp. nov., from alpine glacier cryoconite, and an emended description of the genus *Devosia*. Int. J. Syst. Evol. Microbiol. 62:710–715. <http://dx.doi.org/10.1099/ijs.0.023937-0>.
  13. Sato I, Ito M, Ishizaka M, Ikunaga Y, Sato Y, Yoshida S, Koitabashi M, Tsushima S. 2012. Thirteen novel deoxynivalenol-degrading bacteria are classified within two genera with distinct degradation mechanisms. FEMS Microbiol. Lett. 327:110–117. <http://dx.doi.org/10.1111/j.1574-6968.2011.02461.x>.
  14. Xu J, Ji F, Wang H, Wang J, Lin F, Shi J. 2010. Isolation and identification of deoxynivalenol degradation strains. Sci. Agricultura. Sinica 43:4635–4641.
  15. Zhou T, He JW. 2009. Bacterial isolate, methods of isolating bacterial isolates, and methods for detoxification of trichothecene mycotoxins. United States Provisional Patent Application No. 61/249,023. Filed October 6, 2009.
  16. Zhou T, He JW. 2010. Bacterial isolate, methods of isolating bacterial isolates, and methods for detoxification of trichothecene mycotoxins. Patent Cooperation Treaty Application No. 61/249,023. Filed October 6, 2010.
  17. Ramirez-Gonzalez RH, Leggett RM, Waite D, Thanki A, Drou N, Caccamo M, Davey R. 2013. StatsDB: platform-agnostic storage and understanding of next generation sequencing run metrics. F1000Res. 2:248. <http://dx.doi.org/10.12688/f1000research.2-248.v2>.
  18. Aziz RK, Bartels D, Best AA, DeJongh M, Disz T, Edwards RA, Formsma K, Gerdes S, Glass EM, Kubal M, Meyer F, Olsen GJ, Olson R, Osterman AL, Overbeek RA, McNeil LK, Paarmann D, Paczian T, Parrello B, Pusch GD, Reich C, Stevens R, Vassieva O, Vonstein V, Wilke A, Zagnitko O. 2008. The RAST server: rapid annotations using subsystems technology. BMC Genomics 9:75. <http://dx.doi.org/10.1186/1471-2164-9-75>.